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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/645,827

Filing Date: August 25, 2000

Appellant(s): FLANDERS ET AL.

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J. Grant Houston  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 09/28/2009 appealing from the Office action mailed 01/22/2009.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments after Non-Final**

The appellant's statement of the status of amendments after Non-final rejection contained in the brief is correct.

No amendment after Non-final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

Wolfgang et al., "Flexible Automated Assembly of Micro-Optical Elements (Optical SMD)" SPIE, Vol. 2906, Microrobotics: Components and Applications (December 1996), pp. 162-170.

US 6,087,621

Kang et al.

05-2000

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3-8, 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over (SPIE Vol. 2906, Microrobotics: Components and Applications) in view of Kang et al. (US Patent No. 6087621).

Wolfgang teaches a supply area (Figure 6, Stock); a pick and place machine that picks and places the components to the work area (abstract and Section 5, first paragraph and figure 6); and an aligner that characterizes the positions of the components on the bench and mechanically adjusts the relative position (section 5.3, paragraphs 1-4, figure 6 and figure 9a); an aligner that activates/energizes a workpiece and detects an optical signal and adjusts the components (Section 5.3, Paragraphs 1-4 and Figure 9a, measuring system); a jaw gripper that acts cooperatively with the aligner

to allow on line alignment control of the optical element (see section 5.2-5.3); and an optical detector to detect the optical signal (see section 5.2).

Regarding the function language calling for characterizing the positions of the optical components after bonding, It is noted that Wolfgang discloses a corresponding structure which includes collimated laser beam and an optical sensing system already mounted on the reference plate that allow on-line alignment control of the optical element (figures 8 and section5.2), and said system would be capable of characterizing the positions after bonding as well. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), See MPEP 2114.

Wolfgang teaches a pick-and-place machine with laser welding head mounted thereon that is used for laser point welding or bonding of the mounting structures holding the optical components to the optical bench. While the Examiner recognizes that Wolfgang specifically recites laser point welding, solder bonding using a laser beam is known in the art. Therefore, it is the examiner's position that the apparatus of Wolfgang would be capable of (laser) soldering the mounting structures to the benches, which the claims do not exclude. (Rhee et al. US Patent No. 6,219,484 is cited as evidence to support the known technique of laser soldering). While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than

function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), See MPEP 2114.

Wolfgang fails to teach mechanically adjusting the relative positions of the optical components by plastically deforming the mounting structures, which have been bonded to the optical benches by the pick-and-place machine.

Kang et al. discloses a post weld phenomenon known in the art that is often referred to as the post weld shift (PWS), which is a deformation due to solidification shrinkage of the metal, when an optical component (optical fiber ferrule , 110, figure 5) positioned in a mounting structure (optical fiber support, 120, figure 5) is bonded (i.e. laser welded) to an optical bench (submodule substrate 140, figure 5) resulting in a weld shift, that leads to the reduction of both coupling efficiency and device throughput stability; wherein said post welding shift is corrected by using a conventional mechanical tool such as a wrench to mechanical force or hammer the optical fiber support structure, and thereby mechanically deforming (plastically deforming) the bonded structure so as to adjust the mounting structure in order to obtain good and efficient coupling/bonding (Kang et al. abstract, column 1, lines 44-column 2, lines 12 and column 3, lines 48-55 ). It should also be noted that the examiner is not relying on the entire invention of Kang et al. but only on said piece of art as evidence that the use of hammering or mechanically/plastically deforming solder bonded support structure for correcting post weld shift is known in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the optical system production line Wolfgang to include a tool or a

mechanism (i.e. conventional hammer, such as a wrench) in the optical system aligner for hammering or mechanically deforming (equated to plastically deforming) the mounting structures, to adjust or correct the relative changes in position of the optical components due to post welding shift, as said mechanical adjustment is known in the art as exemplified by Kang et al., and doing so would ensure optimum and precise alignment of the optical system assembly and achieve effective coupling between parts bonded to form the optical system (Kang et al. , column 1, lines 44-column 2, lines 12).

Regarding claims 17, 19 and 20, Wolfgang teaches a supply area (Figure 6, Stock); a pick and place machine that picks and places the components to the work area (abstract and Section 5, first paragraph); and an aligner that characterizes the positions of the components on the bench and mechanically adjusts the relative position (section 5.3, paragraphs 1-4); an aligner that activates/energizes a workpiece and detects an optical signal and adjusts the components (Section 5.3, Paragraphs 1-4 and Figure 9a, measuring system); a jaw gripper that acts cooperatively with the aligner to allow on line alignment control of the optical element (see section 5.2-5.3); and an optical detector to detect the optical signal (see section 5.2).

Regarding the function language calling for characterizing the positions of the optical components after bonding, it is noted that Wolfgang discloses a corresponding structure which includes collimated laser beam and an optical sensing system already mounted on the reference plate allow the on-line alignment control of the optical element) that is used to characterize the positions of the structures before they are bonded. Therefore said structure would be capable of characterizing the positions after

bonding as well. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), See MPEP 2114.

Wolfgang teaches a pick-and-place machine with laser welding head mounted thereon that is used for laser point welding or bond of the mounting structures holding the optical components to the optical bench. While the Examiner recognizes that Wolfgang specifically recites laser point welding, solder bonding using a laser beam is known in the art. Therefore, it is the examiner's position that the apparatus of Wolfgang would be capable of (laser) soldering the mounting structures to the benches, which the claims do not exclude. (Rhee et al. US Patent No. 6,219,484 is cited as evidence to support the known technique of laser soldering). While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), See MPEP 2114.

Wolfgang fails to teach mechanically adjusting the relative positions of the optical components by plastically deforming the mounting structures, which have been bonded to the optical benches by the pick-and-place machine.

Kang et al. discloses a post weld phenomenon known in the art that is often referred to as the post weld shift (PWS), which is a deformation due to solidification shrinkage of the metal, when an optical component (optical fiber ferrule , 110, figure 5)

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positioned in a mounting structure (optical fiber support, 120, figure 5) is bonded (i.e. laser welded) to an optical bench (submodule substrate 140, figure 5) resulting in a weld shift, that leads to the reduction of both coupling efficiency and device throughput stability; wherein said post welding shift is corrected by using a conventional mechanical tool such as a wrench to mechanical force or hammer the optical fiber support structure, and thereby mechanically deforming (plastically deforming) the bonded structure so as to adjust the mounting structure in order to obtain good and efficient coupling/bonding (Kang et al. abstract, column 1, lines 44-column 2, lines 12 and column 3, lines 48-55 ). It should also be noted that the examiner is not relying on the entire invention of Kang et al. but only on said piece of art as evidence that the use of hammering or mechanically/plastically deforming solder bonded support structure for correcting post weld shift is known in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the optical system production line Wolfgang to include a tool or a mechanism (i.e. conventional hammer, such as a wrench) in the optical system aligner for hammering or mechanically deforming (equated to plastically deforming) the mounting structures, to adjust or correct the relative changes in position of the optical components due to post welding shift, as said mechanical adjustment is known in the art as exemplified by Kang et al., and doing so would ensure optimum and precise alignment of the optical system assembly and achieve effective coupling between parts bonded to form the optical system (Kang et al. , column 1, lines 44-column 2, lines 12).

### **(10) Response to Argument**

Appellants argue that Wolfgang discloses a system in which the UTH's are placed on a bench with a robot gripper, as illustrated in its Fig. 8A. The UTH's are then fine positioned until they are properly aligned in the optical link. See Fig. 8B of Wolfgang. Only then are the UTH's attached to the optical bench via laser welding as shown in the Fig. 8C of Wolfgang. Likewise, Kang uses laser welding as conceded by the pending Office Action at page 5. In summary, Appellant argues that the present claims require a pick-and-place machine that solder bonds mounting structures to optical benches. Both of the applied references teach the use of laser welding.

With respect to a pick-and-place machine that bonds mounting structures to optical benches it should be pointed out that Wolfgang teaches an optical system production line that comprises a robot gripper (equated to the claimed machine) that picks the components from the supply area (stock, figure 6), places the components on the benches; said robot pick and place device or machine has a laser welding head mounted thereon that is used for laser point welding or bond the mounting structures holding the optical components to the optical bench (see, Wolfgang, abstract, section 5 and figure 6).

With respect to a pick-and-place machine that solder bonds the mounting structures to optical benches. The examiner agrees Wolfgang differs from the claimed invention in that solder bonding is not expressly disclosed. While the Examiner recognizes that Wolfgang specifically recites laser point welding, laser welding of optical components is synonymously referred to or known in the art as laser soldering as

exemplified by Rhee et al. US Patent No. 6,219,484, column 4, lines 8-11, cited as a supporting evidence). Regardless, it is the examiner's position that the apparatus of Wolfgang would be capable of (laser) soldering to bond the mounting structures to the benches, which is not excluded from the claims. More importantly, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), See MPEP 2114.

Appellant also argues that the claimed invention differs from Wolfgang in its recitation of optical system aligner that characterizes the positions of the optical components held by the mounting structures which **have been solder bonded** to the optical benches while Wolfgang discloses characterizing **before bonding**.

The Examiner appreciates this difference in the methods of Wolfgang and the claimed invention but respectfully points out that the present claims are directed to an apparatus. Wolfgang discloses an optical system aligner which includes a collimated laser beam and an optical sensing system already mounted on the reference plate to allow the on-line alignment control of the optical element that is used to characterize the positions of the structures before they are bonded. However, Wolfgang's optical system aligner is structurally indistinguishable from Applicant's optical system aligner and therefore the Examiner maintains the position that it would be capable of characterizing the positions after bonding. More importantly, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be

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distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), See MPEP 2114.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Michael Aboagye/

Examiner, Art Unit 1793

Conferees:

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 1793

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700